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Cold Preparation of Heroin in a Black Tar Market

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Abstract

Background: Black tar heroin is typically prepared for injection with heat which decreases the risk of HIV transmission by inactivating the virus. We received reports that persons who inject drugs (PWID) in Tijuana, Baja California, Mexico, a black tar heroin market, were using only water to dissolve heroin.

Objectives: Because Tijuana abuts San Diego County, CA, United States, we undertook the present analyses to determine the prevalence of this practice among PWID in San Diego, California.

Methods: PWID completed quarterly behavioral assessments and serological testing for blood-borne viruses. Bivariate and multivariable logistic regression models were constructed to assess for individual, social, and structural correlates of preparing heroin without heat within the preceding 6 months.

Results: Nearly half of black tar heroin users (149/305) reported they had prepared heroin without heat within 6 months. In multivariable analysis, cold preparation was independently associated with younger age (10 year decrease; AOR=1.25; 95% CI 1.03, 1.53), more drug injecting acquaintances (per 5 acquaintance increase; AOR=1.05; 95% CI 1.01, 1.09) and prefilled syringe use (injecting drugs from syringes that are already filled with drugs before purchase; AOR=1.86; 95% CI 1.14, 3.02).

Conclusions/Importance: To our knowledge, this is the first paper to report that PWID living in a black tar heroin market are preparing heroin without heat. Additional research is needed to determine whether this is an endemic practice or PWID are engaging in new forms of drug preparation in response to changes in the environment.

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Declaration of interest

All authors declare that they have no conflict of interest.

Keywords

Heroin; drug market; cooking; preparation; persons who inject drugs

Introduction

In the United States, white and light brown powder heroin from Columbia predominate in East coast drug markets while Mexican black tar heroin predominates West coast drug markets (DEA, 2013). Powder and tar heroin have different chemical properties (e.g. water solubility, PH balance, heat stability, and purity) that require different preparation methods to make them soluble for injection (Ciccarone, 2009). Typical black tar heroin preparation includes stirring an injectable portion of black tar heroin and water over heat until the heroin dissolves (Bourgois, 1998). Powder heroin can be prepared for injection by stirring it with room temperature water (or shaking powder heroin and water together within the barrel of a syringe) (Rao and Hoffman, 1997). Heating drug solution above 65 degrees Celsius inactivates HIV living in the heating vessel (Clatts et al., 1999; Heimer & Abdala, 2000). Preparation practices may partially explain why rates of HIV infection are lower in settings with black tar heroin, like California, compared to settings dominated by powder heroin, like the Eastern United States (Ciccarone & Bourgois, 2003).

Beginning in December 2012, we received reports that persons who inject drugs (PWID) in Tijuana, Baja California, Mexico were using only water to dissolve heroin, which could increase their susceptibility to blood-borne viruses (BBV) (K. Wagner & S. Leal, 2012). San Diego County, California abuts Tijuana, is home to the busiest land border crossing in the world, and sits along major production and trafficking routes for drugs entering the US from Mexico (Brouwer et al., 2006). Studies have shown HIV transmission is associated with cross border mobility (Apostolopoulos & Sonmez, 2007; Rachlis et al., 2007). This may be explained, in part, by the role of mobility in linking otherwise geographically separate social networks and creating “bridges” between high and low risk groups (Costenbader, Astone, & Latkin, 2006; Haffmann, Su, & Pach, 1997).

After receiving the reports from our research partners in Tijuana, we added a single item to an epidemiological survey about drug use being conducted in San Diego. The question was “*When you injected heroin in the last 6 months, did you ever dissolve the drug solution WITHOUT using a match, lighter or other source of heat to help dissolve the drug?*” with binary response option (yes versus no).

In the present study, we assess the frequency of cold preparation of injection drugs among PWID in San Diego and describe individual, social, and structural factors associated with this practice. Because this is a descriptive look at a relatively understudied phenomenon, no hypotheses guided our analysis. However, we utilized a risk environment framework that considered the impact of individual, social and environmental processes that influence and constrain drug use.(Rhodes, 2002)

Methods

Participants were recruited by bilingual staff using targeted advertising and street outreach in areas with a known high prevalence of drug use, and by word-of-mouth referrals. These analyses were restricted to 305 primarily black tar heroin users who were over 18 years of age who reported injection drug use within 30 days. They completed a computer assisted personal interview and serological testing for HIV and HCV. Drawing from the risk environment framework, at the individual-level we considered: socio-demographic characteristics, number of years injecting, and frequency of heroin use. At the social-level we considered: primary syringe source, frequency of syringe and paraphernalia sharing which included from friends, family, or acquaintances, and number of acquaintances who inject drugs. At the structural level we considered: primary injection venue, housing status, prefilled syringe use (asked of participants as whether they had injected drugs from syringes that were already filled with the drugs prior to them purchasing or obtaining them), and rushing an injection due to police presence. Prefilled syringe use was considered a structural factor because it has been associated with drug market conditions (i.e., only form available for purchase), public drug consumption citation, and situations where injection is rushed to avoid arrest (Armenta, 2015).

Descriptive statistics were used to describe the sample. Bivariate logistic regression was used to assess factors associated with cold preparation as a response (yes versus no) to the question “*When you injected heroin in the last 6 months, did you ever dissolve the drug solution WITHOUT using a match, lighter or other source of heat to help dissolve the drug?*” Factors significant at $p < 0.20$ were entered simultaneously into a multivariable logistic regression analysis to produce a saturated model (Mickey & Greenland, 1989). Non-significant variables were manually removed in a stepwise manner from the saturated model using likelihood ratio tests to compare models for goodness of fit. Only variables significant at $p < 0.05$ remained in the final model. Variables were tested for interactions and collinearity was assessed using variance inflation factors and condition indices. Analyses were conducted with SAS 9.3 (Cary, NC). The study was approved by the University of California, San Diego Institutional Review Board.

Results

Nearly half the sample (150/305) reported they prepared heroin without heat within six months (table 1). In bivariate analysis (table 1), compared to participants who prepared drugs with heat, those reporting cold preparation were more likely to be anti-HCV-seropositive (81.4% vs. 62.3%; $P < 0.01$), have more drug injecting acquaintances (mean acquaintances 35.3 vs. 25.6 individuals; $P = 0.01$), report prefilled syringe use (42.7% vs. 28.4%; $P < 0.01$), and report more instances of rushed injection due to police presence (38.1% vs. 26.5%; $P < 0.01$). Additionally, age and HIV status met inclusion criteria ($P < 0.20$) in the multivariable model. Those who were younger (mean age 41.1 vs. 43.7 years old; $P = 0.06$) were more likely to report cold preparation of heroin within 6 months. Individuals who were HIV positive were less likely to report this practice (2.1% versus 6.0%; $P = 0.10$). In multivariable analysis (Table 2), cold preparation was independently associated with younger age (per 10-year decrease; adjusted odds ratio [AOR]=1.25; 95% CI 1.03, 1.53),

more drug injecting acquaintances (per 5 acquaintance increase; AOR=1.05; 95% CI 1.01, 1.09) and prefilled syringe use (AOR=1.86; 95% CI 1.14, 3.02).

Discussion

To our knowledge, this is the first paper to report that PWID on the west coast of the United States are preparing heroin without heat. Cold preparation was independently associated with younger age, larger injection drug networks and prefilled syringe use. Age, while statistically significant, may not be clinically significant. The difference in median age between groups was three years. Additional research is needed to understand if individual-level factors, such as age, are impacting cold preparation of heroin.

In this sample, PWID reporting preparing heroin without heat had, on average, 10 more injection drug acquaintances. This may suggest that individuals in larger or more diverse injecting networks are exposed to different or more varied drug injection practices. The type of network contact we measured, “acquaintances who inject drugs”, could be considered a “weak” social tie. Weak ties are particularly amenable for spreading information within networks and facilitating the diffusion of new practices or social norms (Granovetter, 1983). However, weak ties can also serve to “bridge” individuals in high and low risk networks, which could facilitate the introduction of BBVs into an otherwise closed injecting network, thereby changing network structure in a way that increases risk for BBV infection (Morris, Podhisita, Wawer, & Handcock, 1996; Rothenberg et al., 1998).

Finding that cold heroin preparation is associated with prefilled syringe use suggests these users may constitute a unique group who engage in high risk behaviors. Previous research has shown that prefilled syringes are used in situations where injection is rushed to avoid arrest (Armenta, Roth, Wagner, et al, 2015). It may be that cold preparation, like prefilled syringe use, decreases the time spent preparing drugs. Additional research is needed that explores the context in which heroin is prepared without heat or prefilled syringes are purchased. It may be the case there are circumstances, either individual or social, that make these methods preferable. It could also be that these users may face event-level structural factors that impede other drug preparation methods. For example, fear of arrest has been shown to increase the odds of risky injection practices (Bluthenthal, Kral, Erringer, & Edlin, 1999; Bluthenthal, Lorvick, Kral, Erringer, & Kahn, 1999). Thus, cold preparation, similarly to like prefilled syringe use, may be a behavior PWID engage in to decrease injection time in order to avoid arrest.

There are several important limitations that must be considered when interpreting our findings. Most importantly, we do not know what type of heroin participants were injecting. While we limited these analyses to primarily black tar users in a primarily black tar market, we can not be sure that the episodes(s) of not heating reported were black tar. Further, we do not know the frequency with which participants engaged in cold preparation nor the contextual factors operating at the event-level that influenced this practice. It could be that this behavior occurs infrequently and in response to isolated events in which contextual factors disallow heating heroin (i.e., a subject is experiencing withdrawal, has heroin and paraphernalia but no lighter available, or structural factors like police presence impede

heating). Finally, our study identified the prevalence of this behavior within six months. Therefore, we cannot comment on whether this is truly an emerging phenomenon in this community. More research is needed to more fully understand this behavior, the frequency of its occurrence over time and whether shifting drug type availability is altering drug preparation practices. Qualitative research may be best suited to understand the context in which cold preparation is being used and to determine if this an endemic practice or a response to increasing availability of different forms of heroin in the Western U.S. (DEA, 2013; Betanzos & Incautaron, 2014)..

Conclusion

The identification of cold heroin preparation in a market that, until now, has been dominated by black tar heroin is noteworthy and could foreshadow an increase in BBV transmission. While additional research is needed to better understand the frequency and/or rationale behind this practice, the recent HIV outbreak in Indiana related to opioid injection provides a cautionary tale that urges public health professionals to heed epidemiological evidence that suggests injection drug behavior is evolving (Strathdee & Beyrer, 2015).

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References

- Apostolopoulos Y, Sonmez SF. Population Mobility and Infectious Disease; 2007.
- Armenta R, Roth A, Wagner K, Strathdee SA, Brodine SK, Cuevas-Mota J, ... Garfein RS (2015) Prevalence and Correlates of the Use of Prefilled Syringes Among Persons Who Inject Drugs in San Diego, CA. *Journal of Urban Health*, 1–11. [PubMed: 25344356]
- Betanzos S Incautaron 750 mil dólares, en heroína. *El Mexicano*. 9 6, 2014; Estatal.
- Bluthenthal RN, Kral AH, Erringer EA, Edlin BR (1999) Drug Paraphernalia Laws and Injection-related Infectious Disease Risk Among Drug Injectors. *Journal of Drug Issues*, 29(1), 1–16.
- Bluthenthal RN, Lorvick J, Kral AH, Erringer EA, Kahn JG (1999) Collateral Damage in the War on Drugs: HIV Risk Behaviors Among Injection Drug Users. *International Journal of Drug Policy*, 10, 25–38.
- Bourgeois P (1998) The Moral Economies of Homeless Heroin Addicts: Confronting Ethnography, HIV Risk, and Everyday Violence in San Francisco Shooting Encampments. *Substance Use & Misuse*, 33(11), 2323–2351. [PubMed: 9758016]
- Brouwer KC, Case P, Ramos R, Magis-Rodriguez C, Bucardo J, Patterson TL, & Strathdee SA (2006) Trends in Production, Trafficking, and Consumption of Methamphetamine and Cocaine in Mexico. *Substance Use & Misuse*, 41(5), 707–727. [PubMed: 16603456]
- Ciccarone D & Bourgeois P (2003) Explaining the Geographical Variation of HIV Among Injection Drug Users in the United States. *Substance Use & Misuse*, 38(14), 2049–2063. [PubMed: 14677781]
- Ciccarone D (2009) Heroin in brown, black and white: Structural factors and medical consequences in the US heroin market. *International Journal of Drug Policy*, 20(3), 277–282. [PubMed: 18945606]
- Clatts MC, Heimer R, Abdala N, Goldsamt LA, Sotharan JL, Anderson KT, ... Kyriakides T (1999) HIV-1 Transmission in Injection Paraphernalia: Heating Drug Solutions May Inactivate HIV-1. *Journal of Acquired Immune Deficiency Syndromes*, 22(2), 194–199. [PubMed: 10843535]
- Costenbader EC, Astone NM, & Latkin CA (2006) The dynamics of injection drug users' personal networks and HIV risk behaviors. *Addiction*, 101(7), 1003–1013. [PubMed: 16771892]

- Drug Enforcement Agency [DEA]. (2013) 2011 Heroin Domestic Monitor Program Drug Intelligence Report.
- Granovetter M (1983) The strength of weak ties: A network theory revisited. *Sociological Theory*, 1(1), 201–233.
- Heimer R & Abdala NV (2000) Viability of HIV-1 in syringes: implications for interventions among injection drug users. *AIDS Reader*, 10(7).
- Hoffmann JP, Su SS, & Pach A (1997) Changes in network characteristics and HIV risk behavior among injection drug users. *Drug & Alcohol Dependence*, 46(1–2), 41–51. [PubMed: 9246552]
- Mickey RM & Greenland S (1989) The impact of confounder selection criteria on effect estimation. *American Journal of Epidemiology*, 129(1), 125–137. [PubMed: 2910056]
- Miller CL, Firestone M, Ramos R, Burris S, Ramos ME, Case P, ... Strathdee SA (2008) Injecting drug users' experiences of poisoning practices in two Mexican-U.S. border cities: Public health perspectives. *International Journal of Drug Policy*, 19(4), 324–331. [PubMed: 17997089]
- Morris M, Podhisita C, Wawer MJ, & Handcock MS (1996) Bridge populations in the spread of HIV/AIDS in Thailand. *AIDS*, 10(11), 1265–1271. [PubMed: 8883589]
- Rachlis B, Brouwer KC, Mills EJ, Hayes M, Kerr T, & Hogg RS (2007) Migration and transmission of blood-borne infections among injection drug users: understanding the epidemiologic bridge. *Drug & Alcohol Dependence*, 90(2–3), 107–119. [PubMed: 17485179]
- Rao RB & Hoffman RS (1997) Medical Complications of Substance Abuse. *Advanced Emergency Nursing Journal*, 19(4), 81–88.
- Rothenberg RB, Potterat JJ, Woodhouse DE, Muth SQ, Darrow WW, & Klovdahl AS (1998) Social network dynamics and HIV transmission. *AIDS*, 12(12), 1529–1536. [PubMed: 9727575]
- Strathdee SA & Beyrer C (2015) Threading the Needle — How to Stop the HIV Outbreak in Rural Indiana. *New England Journal of Medicine*, 373(5), 397–399. [PubMed: 26106947]
- Wagner KD, & Leal S (2012). Personal communication regarding study participants dissolving heroin without heat on December 9, 2012.
- Rhodes T (2002). The 'risk environment': a framework for understanding and reducing drug-related harm. *International Journal of Drug Policy*, 13(2), 85–94. doi: 10.1016/S0955-3959(02)00007-5

Table 1.Factors associated with injecting heroin prepared without heat, past 6 months (N=305)[†]

	Total	Reported cold preparation of heroin	Did not report cold preparation of heroin	Odds Ratio	95% Confidence Interval	P-Value
Proportion of sample	305 (100%)	150 (49.0%)	155 (50.8%)			
Individual factors						
Age, years - mean(SD)	42.4 (12.1)	41.1 (11.0)	43.7 (12.1)	1.02	1.0, 1.04	0.06
Gender, male (vs. female) (n=302)	213 (70.5%)	109 (72.7%)	104 (68.4%)	0.82	0.50, 1.34	0.42
Race/Ethnicity						
White	151 (49.5%)	69 (46.0%)	82 (52.9%)	Ref	-	0.20
Hispanic	101 (33.1%)	56 (37.3%)	45 (29.0%)	1.48	0.89, 2.45	
Black	27 (8.9%)	10 (6.7%)	17 (11.0%)	0.70	0.30, 1.63	
Other	26 (8.5%)	15 (10.0%)	11 (7.1%)	1.62	0.70, 3.76	
Annual Income, < \$10,000 (vs. > \$10,001 USD)	218 (71.5%)	107 (71.3%)	111 (71.6%)	0.99	0.60, 1.62	0.96
Relationship status, single (vs. partnered)	274 (89.8%)	135 (90.0%)	139 (87.9%)	1.04	0.49, 2.18	0.93
Educational attainment						
<High school	102 (33.4%)	56 (37.3%)	46 (29.7%)	Ref	-	0.37
High school graduate or equivalent	97 (31.8%)	45 (30.0%)	52 (33.5%)	1.01	0.58, 1.75	
>High school	106 (34.8%)	49 (32.7%)	57 (36.8%)	1.42	0.82, 2.44	
HIV status, positive (vs. negative) (n=290)	13 (4.2%)	3 (2.1%)	10 (6.0%)	0.33	0.09, 1.23	0.10
HCV status, positive (vs. negative) (n= 290)	222 (71.2%)	118 (81.4%)	104 (62.3%)	2.65	1.57, 4.46	< 0.01
Number of years injecting (mean, SD);	21 (13.8)	20.6 (13.4)	21.4 (14.1)	1.00	0.98, 1.01	0.59
Injected >1 time per day last 6 months (vs. once daily or less) (n=285)	121 (42.5%)	62 (44.3%)	59 (40.7%)	1.16	0.72, 1.85	0.54
Social Factors						
Obtained most syringes from unsafe sources, last 6 months* (vs. safe sources)* (n= 299)	110 (36.8%)	51 (34.7%)	59 (38.8%)	0.84	0.52, 1.34	0.46
Number of acquaintances who inject drugs in last 6 months (mean, SD)	29.8 (36.7)	35.3 (42.4)	24.6 (29.4)	1.01	1.00, 1.02	0.01
Shared syringes last 6 months, (vs. never), (n= 276)	184 (66.7%)	97 (68.8%)	87 (64.4%)	0.82	0.50, 1.36	0.44
Shared other injection equipment, last 6 months (vs. never), (n= 302)	223(73.4%)	114(76.5%)	109(70.3%)	1.37	0.82, 2.29	0.22
Structural Factors						

	Total	Reported cold preparation of heroin	Did not report cold preparation of heroin	Odds Ratio	95% Confidence Interval	P-Value
Housing status, homeless (vs. housed)	191 (62.6%)	98 (65.3%)	93 (60.0%)	1.26	0.79, 2.00	0.34
Injected most often in public place, last 6 months (vs. private places) ^{**} (n= 298)	102 (34.2%)	55 (37.4%)	47 (31.1%)	1.32	0.82, 2.14	0.25
Rushed injection due to police presence, last 6 months (vs. never), (n=302)	97 (32.1%)	56 (38.1%)	41 (26.5%)	1.71	1.05, 2.79	<0.01
Prefilled syringe use, ever (yes vs. no)	108(35.4%)	64(42.7%)	44(28.4%)	2.16	1.36, 3.43	<0.01

[^] N=305 unless otherwise indicated in parentheses;

[†] cold-cooking is defined as injecting heroin not dissolved with heat,

^{*} safe sources (syringe exchange program, doctor/ clinic/ hospital/, veterinary clinic/pet store, market); unsafe sources (spouse, family member, or sex partner, friend, drug dealer, Hit doctor, shooting gallery, on the street, some other place);

^{**} private location (my/someone else's home, car); public location (shooting gallery, construction site, alleyway, bar/club, on the street, vacant lot, park, freeway overpass/bridge/canyon, public restroom)

Table 2.

Multivariable logistic regression analysis of factors associated with injecting heroin prepared without heat, past 6 months (N=294)[^]

Variable	Adjusted Odds Ratio	95% Confidence Interval	P-Value
Prefilled syringe use, ever (Yes vs. no)	1.86	1.14, 3.02	0.01
Age (per 10 year decrease)	1.25	1.03, 1.53	0.02
Number of acquaintances who inject drugs in last 6 months (mean, SD; 5 acquaintance increase)	1.05	1.01, 1.09	<0.01

[^]Variables significant *P*

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